Questions for Ray Johnson

Notes

Questions for Lucita

Notes

Questions for Rick Arnold

Notes

Questions for NRC
ask about Polonium-210, Lead-210 and Thorium-230 analysis. Why for surface water and not for ground
ask how GW modeling to evaluate ACLs is conducted.

Notes
water.

Questions for Powertech

10.8.2.1.3 Optional Groundwater Sweep , page 131 of Class III permit app:

“For example, additional restoration bleed may be used to recover flare of ISR solutions outside of the well field pattern area.”

Can they tell if flare of ISR solutions is occurring outside the wellfield patter before it becomes an excursion? How is it detected? Increase in GW level in perimeter monitoring wells?

Notes

Table 1. Class III Draft Area Permit Specific Comments and Recommended Permit Language Revisions

No.	Page #	Recommended Alternative Language or Other Modification	Explanation of Alternative(s)	Comment	EPA Notes/Response
22	15	**II.F. Wellfield Pump Test Requirements** 2. The Permittee shall conduct the wellfield pump tests with sufficient iterations and using pumping wells in as many locations within the wellfield as necessary to create drawdown in each injection interval perimeter monitoring well.	Powertech requests modification of Section 5.4 of the Fact Sheet for consistency with the draft permit and permit application. No change is requested to the draft permit condition.	Section 5.4 of the Fact Sheet states that "The pump test duration must be sufficient to create a suitable response in the injection interval perimeter monitoring well ring, a minimum drawdown of 1 foot." This is not specified in the draft permit provision, which states that that the wellfield pump tests should be conducted "as necessary to create drawdown in each injection interval perimeter monitoring well." It is also not consistent with the application, which indicates that the minimum drawdown would "typically" be 1 foot but does not commit to creating 1 foot of drawdown in every perimeter monitoring well. There may be instances where a pumping test produces a clear response in a perimeter monitoring well, but due to distance from the pumping well or other considerations the response is not more than 1 foot.	
25	19	**II.I.3. Information to Submit to the Director to Obtain Approval of the Proposed Exemption of Inyan Kara Aquifers within the Proposed Aquifer Exemption Boundary around Burdock Wellfields 6 and 7** If the Permittee has not demonstrated to the Director that Well 16 located in NWSE Section 1 T7S R1E ~~has been plugged and abandoned~~ does not currently serve as a source of drinking water before issuance of the Final Class III Area Permit, the Permittee shall submit the following information to the Director for proposing exemption of the Inyan Kara aquifer within the proposed exemption boundary: a. Injection Authorization Data Package Reports including all the information under Part II, Sections B through G and Section I. This information will serve as additional analysis of the amenability of the injection interval to the in-situ method for uranium recovery as required under § 144.7(c)(1). b. A demonstration that Well 16 located in NWSE Section 1 T7S R1E ~~has been plugged and abandoned~~ does not currently serve as a source of drinking water.	Powertech requests that the permit provision be modified for consistency with 40 CFR § 146.4(a).	Powertech disagrees with EPA's conclusion that Well 16 must be plugged and abandoned in order to demonstrate that it is not a drinking water well. Apparently, EPA's conclusion is based on the fact that this well is considered a domestic well and the State of South Dakota does not differentiate between stock water and drinking water uses for domestic wells. There are several problems with this line of reasoning: 1. EPA is overreaching its regulatory authority by declaring that the only way to determine that Well 16 does not currently serve as a source of drinking water, as required by 40 CFR § 146.4(a), is by plugging the well. Proof that the well does not currently serve as a source of drinking water includes the following (Exhibit 032 at 5): a. The landowner has signed an agreement that the well cannot be used for drinking water. b. The well is disconnected from any plumbing that would allow it to be used in a residence or otherwise as a drinking water source. c. The well is controlled by lease agreements that give Powertech clear control over the use of the well. d. The well is not accessible by the public. The wellhead is contained within an underground vault. e. Powertech has already provided a replacement source of drinking water for the residence (delivered water). 2. Powertech committed in its Class III permit application and approved NRC license application to provide a replacement water source for any well removed from private use. Powertech is bound by this commitment to provide an alternate drinking water source for the residence formerly served by Well 16 for the duration of the project, which surpasses the regulatory requirement of demonstrating that the well does not currently serve as a drinking water source.	SD DENR REGS CHAPTER 46-1. DEFINITIONS AND GENERAL PROVISIONS 46-1-6. Definition of terms (7) "Domestic use," use of water not exceeding eighteen gallons per minute on an average daily basis, except for larger domestic wells in operation before July 1, 1983, by an individual, or by a family unit or household, for drinking, washing, sanitary, and culinary purposes and other ordinary household purposes; irrigation of a noncommercial family garden, trees, shrubbery, or orchard not greater in area than one acre; eighteen gallons per minute or less for uses in schools, parks, and other public recreation areas; geothermal heat for a single household; or noncommercial on-farm alcohol production. The use of water supplied by a water distribution system for the preceding purposes, for the occupants of schools, hospitals, and other custodial care facilities and for fire protection is a domestic use as against appropriative rights having a priority after June 30, 1978. Stock watering is a domestic use. Use of water not exceeding eighteen gallons per minute on an average daily basis for livestock in a confinement operation, including water for drinking, sanitary and general welfare purposes and for like purposes by those caring for the livestock, is a domestic use. Use of groundwater by water distribution systems, except for irrigation purposes is a domestic use except where groundwater and water in flowing streams constitute the same water supply source, but only to the extent the water was actually used before July 1, 1978; 74:02:01:05.02. Registration of domestic well. The form for registering a domestic well shall be furnished by the chief engineer upon request. The completed form must include the name of the well owner and must be legible. The required fee, a water quality analysis, and a well driller's report of the well construction must be submitted with the form to the chief engineer. Registration is limited to those wells that have been constructed in compliance with the adequate well requirements of chapter 74:02:04.
28	21	Modify or provide additional explanation as to the possible step rate test locations for the Dewey area depicted on Figure 4.	Powertech requests modification of Figure 4 or additional clarification for consistency with Table 9.	Table 9 specifies that the Lower Fall River step rate test should be on the perimeter monitoring well ring for Dewey Wellfield 1 but outside of the perimeter monitoring well ring for Dewey Wellfields 2 and 4. Table 9 similarly specifies that the Lower or Middle Chilson test should be on the perimeter monitoring well ring for Dewey Wellfield 2 but outside of the perimeter monitoring well ring for Dewey Wellfields 1 and 4. In contrast, Figure 4 shows two possible test locations that both coincide with two different perimeter monitoring rings (1a coincides with Dewey Wellfields 1, 2 and 4, and 1b coincides with Dewey Wellfields 1 and 2).	**Ex. 5 Deliberative Process (DP)**
29	29	**Figure 5.** Typical **Well Construction Design** WELL SCREEN (IF USED) GRAVEL PACK (IF USED) SAND TRAP (IF USED) CHECK VALVE (IF USED)	Powertech suggests renaming Figure 5 to include "typical" in the title and adding "(if used)" to the well screen, gravel pack, sand trap and check valve labels on the figure for consistency with the Class III permit application.	Powertech is concerned that the well construction standards depicted in Figure 5 may be construed as requiring a well screen and gravel pack for all injection, production, and monitoring wells. This is inconsistent with Section 11.2 of the permit application, which specifies that the well screen assembly and filter sand may or may not be used. It is also inconsistent with Section 7.3 of the Fact Sheet, which indicates that "The use of filter pack is optional." Figure 11.1 of the permit application depicted the "typical" well construction design, whereas Figure 5 in the draft permit is labeled "Well Construction Design." Adding "typical" to the figure title would make it consistent with the title blocks in Figures 6 and 7 in the draft permit.	Production pipe not in injection wells; only in production wells. Show Permit App Figures 11.1, 11.2 & 11.3 Fig 11.2 Typical Injection wellhead shows 1.5", 1.25" and 1" PE pipe Fig 11.3 Typical Production wellhead shows 2" PE pipe downhole Review #4 & #5 of Comment #32 with Powertech. **Ex. 5 Deliberative Process (DP)**
32	33			4. The sole purpose of injection tubing in the Class III injection wells is to allow for the introduction of lixiviant and oxygen into the well casing at the deepest location possible below the static level of fluid in the well casing. As oxygen solubility increases with depth in water, this is only to insure maximum dissolution of oxygen. 5. There is little or no pressure differential between the inside and outside of injection tubing, since it merely hangs within the water in the injection well, which either partially or fully fills the well casing with the injected fluid.	
35	35	**V.I.1. Demonstration that Manifold Monitoring is Equivalent to Individual Well Monitoring** a. In order for the Permittee to use manifold monitoring rather than individual well monitoring and use the header house pressure gauge as the point of compliance for monitoring injection pressure, the Permittee shall demonstrate that manifold monitoring is comparable to individual well monitoring. b. The Permittee shall conduct a bounding analysis demonstration for each header house that manifold monitoring is comparable to individual well monitoring using the maximum anticipated carbon dioxide and oxygen injection rates ~~demonstrate that the injection pressure measured at the header house pressure gauge is greater than or equal to the injection pressure measured at the wellhead of each well connected to the header house.~~	Powertech proposes to conduct a bounding analysis demonstration for each header house that manifold monitoring is comparable to individual well monitoring using the maximum anticipated carbon dioxide and oxygen injection rates. As long as adjustments stay within the range of the bounding analysis, no repeat demonstration would be required. The bounding analysis would be provided to EPA within the next Quarterly Monitoring Report.	Part V, Section I.1 of the Draft Class III Area Permit would require Powertech repeat the demonstration that manifold monitoring is comparable to individual well monitoring after any adjustments to the carbon dioxide or oxygen feed lines at the header house. Since minor adjustments in the gas flow rates may be made routinely, this would require significant time and expense to retest the pressure at each well after minor adjustments. Further, Powertech does not anticipate a significant impact on the injection pressure based on the gaseous flow rates, since the gases would be dissolved in the lixiviant.	
35 cont	35	c. A demonstration is valid as long as adjustments stay within the range of the bounding analysis ~~until adjustments are made to the carbon dioxide and oxygen feed lines at the header house, which are located in-line after the header house pressure gauge.~~ ~~d. If, after the initial demonstration, any adjustments are made to either of these feed lines, another demonstration shall be performed.~~ ~~e.~~ The bounding analysis shall be provided to EPA within the next A record of injection pressures measured at the header houses and at the wellheads shall be provided with the Quarterly Monitoring Report as required under Part IX, Section F.9.			

2015 PEA Topics

Operating plans in the 2015 PEA that are different from the Class III permit application

a. **Figure 1.3: Life of Mine Schedule**
   - Production: Q3 Year 1 - Q2 Year 12 = 11 years
   - Last Quarter of Restoration: Q1 Year 13
   - Timeframe for the operation of Class V wells based on beginning of Class III well construction through end of restoration:

wellfield construction: Q1 Year 1 - last quarter restoration: Q1 year 13 = 13 years
   - Class III Permit App Figure 10.2: Projected... Schedule

Production: Q1 Year 2 - Q4 Year 9 = 9 years
   - Timeframe for Class V well operation:
     - wellfield construction: Q1 Year 1 - last quarter restoration: Q1 year 10 = 10 years
     - we used 12 years in the Class V permit and fact sheet
   - CEA comment Table 4, C25 about sequence of wellfield development indicates this schedule maybe still flexible?

b. **Figure 1.2: Project Site Map**
   - Wellfield configuration changes: Burdock wellfields 6, 7, 8, 9
   - Wellfield ore zone changes: wellfield 8, 9 and 11
   - After permit modification in Year 7: Expansion of Dewey wellfield 1 and addition of Dewey wellfield 5

c. **Sections 1.3 Project and 16.3 Mine Development reference 4,000 gpm flow rate**
   - Is the maximum production flow rate going to be 4,000 gpm, consistent with the NRC license?
   - No longer considering requesting license amendment to increase production flow rate to 8,000 gpm?
   - If 4,000 gpm, rethink Figure 7.1 Typical Project-wide Flow Rates during Uranium Recovery and Aquifer Restoration?

d. **Section 7.4 Hydrogeological Setting** mentions: "...completion of regional and well field scale groundwater models." Review list of models developed

e. **Table 16.1: Well Field Inventory**

Dewey WF2 and WF4: number of proposed injection wells doesn't quite fit the ratio of 40 injection wells per header house.

f. **Question:** 7.2 Local and Project Geology: "The Lakota formation in the Dewey-Burdock Project area was deposited by a northward flowing stream system." Is this true?

g. Any other changes I didn't list here?

Table of Contents

NRC Info - NUREG-1569 Appendix B

10 CFR Part 40, Appendix A Criterion

Criterion 5B: Conform to the secondary ground-water protection standards.
(5) Ensure hazardous constituents at the point of compliance do not exceed the background concentration, the value in Paragraph 5C, or an approved alternate concentration limit.
(6) Establish alternate concentration limits, if necessary, after considering practical corrective actions, as low as is reasonably achievable requirements, and potential hazard to human health or the environment.

Locations in NUREG–1569 Where the Criterion is Addressed

3.1.4, 5.7.8.4

3.1.4

not sure that Attachment 3 refers to now? Make notes about this

Powerwtech Comment	NRC SEIS Appendix B
Powertech requests the ability to prepare a Closure Plan that will be submitted to EPA for review and approval following NRC approval of groundwater restoration in the first wellfield. The Closure Plan will be updated or a new Closure Plan prepared for each subsequent wellfield. The Closure Plan will document groundwater restoration efforts, stability monitoring results, and NRC correspondence during the approval process. This would include documentation of NRC staff's rigorous review process for any ACLs to determine that the ACL does not pose a potential hazard to human health or the environment.As described in Appendix B of the NRC SEIS, this review process includes three risk assessments: 1) a hazard assessment to evaluate the radiological dose and toxicity of the constituents in question and the risk to human health and the environment;2) an exposure assessment to examine the existing distribution of hazardous constituents, potential sources for future releases and potential consequences associated with the human and environmental exposure to the hazardous constituents; and3) a corrective action assessment to identify the preferred corrective action to achieve the hazardous constituent concentration that is protective of human health and the environment (Exhibit 008 at p. B-1).	p. B-1 To determine if the ACL does not pose a potential hazard to human health or the environment, NRC performs three risk assessments (NRC, 2003a). 1) The first is a hazard assessment that evaluates the radiological dose and toxicity of the constituents in question and the risk to human health and environment. 2) The second is an exposure assessment to examine the existing distribution of hazardous constituents, as well as potentia sources for future releases and the potential consequences associated with the human and environmental exposure to the hazardous constituents. 3) The last assessment is a corrective action assessment, which evaluates (i) all applicant proposed corrective actions; (ii) the technical feasibility of each proposed corrective actions; (iii) the costs and benefits associated with each proposed corrective action; and (iv) the preferred corrective action to achieve the hazardous constituent concentration, which is protective of human healt and the environment.

p. B-1 - B-2

To perform these assessments, the NRC staff uses a rigorous review process. Licensees must provide a comprehensive ACL amendment request that addresses groundwater and surface water quality and expected impacts on human health and the environment. Such information required in an amendment request pursuant to 10 CFR Part 40, Appendix A, Criterion 5B(6) includes the following factors:

- Potential adverse effects on groundwater quality, considering the following:
  - — The physical and chemical characteristics of the waste in the licensed site including its potential for migration
  - — The hydrogeologic characteristics of the facility and surrounding land
  - — The quantity of groundwater and the direction of groundwater flow
  - — The proximity and withdrawal rates of groundwater users
  - — The current and future uses of groundwater in the area
  - — The existing quality of groundwater, including other sources of contamination and their cumulative impact on the groundwater quality
  - — The potential for health risks caused by human exposure to waste constituents
  - — The potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents
  - — The persistence and permanence of the potential adverse effects
- Potential adverse effects on hydraulically connected surface water quality, considering the following: . . .

Furthermore, in considering ACL requests, particular importance is placed on protecting underground sources of drinkin water (USDWs). The use of modeling and additional groundwater monitoring may be necessary to show that ACLs in ISR wellfields would not adversely impact USDWs. It must be demonstrated that the licensee has attempted to restore hazardous constituents in groundwater to background or a maximum contaminant level—whichever level is higher.

Further guidance for the review of ACLs for ISR facilities is being developed in a revision of NUREG–1569 (NRC, 2003a